

Appl. No. 10/664,621

Amdt. Dated March 17, 2005

Response to Final Office Action of January 19, 2005

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in this application.

1. (Currently Amended) A lens grinding processing apparatus comprising:
 - an apparatus main body;
 - a pair of lens rotating shafts provided rotatably and adjustably in said apparatus main body for relatively approaching and separating on a same axis to hold an eyeglass lens;
 - a shaft rotating driving device for rotating and driving said pair of lens rotating shafts;
 - lens retaining members fixed to opposed end sections of said pair of lens rotating shafts respectively capable of slanting adjustably for slantably holding said eyeglass lens between said pair of lens rotating shafts;
 - a drilling device for drilling a hole for a point frame into the eyeglass lens held between said lens retaining members;
 - a grinding stone rotatably provided capable of relatively approaching and separating to said lens rotating shafts;
 - a shaft-to-shaft distance variable device for changing a shaft-to-shaft distance between said lens rotating shafts and said grinding stone by relatively approaching and separating said lens rotating shafts and said grinding stone; and

an arithmetic control circuit for adjusting the shaft-to-shaft distance between said lens rotating shafts and said grinding stone by controlling said shaft rotating driving device and the shaft-to-shaft distance variable device in motion based on information $(\theta i, \rho i)$; ~~wherein~~

~~said lens retaining members clamp said eyeglass lens and retain said eyeglass lens so as to be capable of slanting said eyeglass lens in a clamped condition~~

~~; and~~

~~a lens shape measuring device for measuring a lens thickness which is along a lens shape of said eyeglass lens based on the lens shape information $(\theta i, \rho i)$, wherein~~

~~said arithmetic control circuit restricts a movement of said lens shape measuring device to slant the eyeglass lens held between said lens retaining members, and drills the hole for fixing the point frame by said drilling device.~~

2. (Previously Presented) The lens grinding processing apparatus according to claim 1, wherein

each of said lens retaining members is provided with a spheroid joint or a spheroid connection for slantably retaining said eyeglass lens.

3. (Original) The lens grinding processing apparatus according to claim 2, wherein said spheroid joint or the spheroid connection is provided with a movable portion which enables said eyeglass lens to be slanted and adjusted in a condition when said lens retaining members hold said eyeglass lens with a clamping force in a setting range smaller than a predetermined value, and maintains said eyeglass lens in a slanted state by being fixed by a friction in a condition when said lens retaining members hold said eyeglass lens with the clamping force of over the predetermined value.

4. (Original) The lens grinding processing apparatus according to claim 3, wherein

one of said pair of lens rotating shafts is provided rotatably and incapable of moving in an axis direction, and the other of said pair of lens rotating shafts is provided rotatably and capable of moving in the axis direction, and said the other of the lens rotating shafts is provided capable of moving and controlled in the axis direction by a shaft advancing and retracting drive device, and said arithmetic control circuit controls said the other of the lens rotating shafts so as to be advanced and retracted in the axis direction by controlling said shaft advancing and retracting drive device in motion, so that the apparatus is provided capable of adjusting the clamping force by said lens retaining members to said eyeglass lens.

5. (Currently Amended) The lens grinding processing apparatus according to claim 1, wherein

~~said apparatus main body is provided with a lens shape measuring device for measuring a lens thickness which is along a lens shape of said eyeglass lens based on the lens shape information (θ, ρ, r) , and said arithmetic control circuit slants the eyeglass lens held between said lens retaining members by controlling said lens shape measuring device~~ lens rotating shafts in motion.

6. (Currently Amended) The lens grinding processing apparatus according to claim 5, wherein

said arithmetic control circuit carries out a control so that the hole for fixing the point frame is drilled into the slanted eyeglass lens by said drilling device by calculating an angle of gradient of a refractive surface of the eyeglass lens from a result of measurement by said lens shape measuring device, and slanting said eyeglass lens relative to said lens rotating shafts by using said ~~lens shape measuring device~~ lens rotating shafts so as to set a drilling part of the refractive surface of said eyeglass lens to be in a certain angle to said drilling device based on the angle of gradient.

7. (Previously Presented) The lens grinding processing apparatus according to claim 6, wherein

each of said lens retaining members is provided with a spheroid joint or a spheroid connection for slantably retaining said eyeglass lens.

8. (Original) The lens grinding processing apparatus according to claim 7, wherein said spheroid joint or the spheroid connection is provided with a movable portion which enables said eyeglass lens to be slanted and adjusted in a condition when said lens retaining members hold said eyeglass lens with a clamping force in a setting range smaller than a predetermined value, and maintains said eyeglass lens in a slanted state by being fixed by a friction in a condition when said lens retaining members hold said eyeglass lens with the clamping force of over the predetermined value.

9. (Original) The lens grinding processing apparatus according to claim 8, wherein one of said pair of lens rotating shafts is provided rotatably and incapable of moving in an axis direction, and the other of said pair of lens rotating shafts is provided rotatably and capable of moving in the axis direction, and said the other of the lens rotating shafts is provided capable of moving and controlled in the axis direction by a shaft advancing and retracting drive device, and said arithmetic control circuit controls said the other of the lens rotating shafts so as to be advanced and retracted in the axis direction by controlling said shaft advancing and retracting drive device in motion, so that the apparatus is provided capable of adjusting the clamping force by said lens retaining members to said eyeglass lens.

10. (Currently Amended) The lens grinding processing apparatus according to claim 9, wherein

after slanting said eyeglass lens relative to said lens rotating shafts by using said ~~lens-shape measuring device~~ lens rotating shafts with the condition of holding the eyeglass lens between the

lens retaining members with the clamping force in the setting range smaller than said predetermined value by controlling said shaft advancing and retracting drive device in motion, said arithmetic control circuit carries out the control so that the hole for fixing the point frame is drilled into the slanted eyeglass lens by said drilling device by holding said eyeglass lens between said lens retaining members with the clamping force of over the predetermined value by controlling said shaft advancing and retracting drive device in motion.

11. (Original) The lens grinding processing apparatus according to claim 1, wherein said drilling device is provided with an arm retained by said apparatus main body capable of approaching and separating to said lens rotating shafts, an arm driving device for driving said arm to be approached and separated to said lens rotating shafts, a drilling tool which extends in a same direction or in substantially a same direction to extending directions of said lens rotating shafts and is retained by said arm capable of rotating and driving, a tool rotating driving device for rotating and driving said drilling tool, and a relative moving device for relatively approaching and separating said drilling tool and the eyeglass lens retained between said lens retaining members.

12. (Original) The lens grinding processing apparatus according to claim 11, wherein said relative moving device is a tool retaining device which retains said drilling tool to said arm capable of advancing and retracting in an axis direction.

13. (Original) The lens grinding processing apparatus according to claim 11, wherein said relative moving device is provided with a carriage which said pair of lens rotating shafts are fixed and is capable of moving and driving in the extending directions of said lens rotating shafts, and an axis direction driving device which moves and drives the carriage in the extending directions of said lens rotating shafts.

14. (Original) The lens grinding processing apparatus according to claim 13, wherein

said carriage is provided capable of elevating and lowering by said shaft-to-shaft distance variable device.

15. (Original) The lens grinding processing apparatus according to claim 11, wherein a chamfering stone or a grooving cutter is rotatably retained by said arm, and said chamfering stone or the grooving cutter is provided capable of rotating and driving by said tool rotating driving device.

16. (New) A lens grinding processing apparatus comprising:
an apparatus main body;
a pair of lens rotating shafts provided rotatably and adjustably in said apparatus main body for relatively approaching and separating on a same axis to hold an eyeglass lens;
a shaft rotating driving device for rotating and driving said pair of lens rotating shafts;
lens retaining members fixed to opposed end sections of said pair of lens rotating shafts respectively capable of slanting adjustably for slantably holding said eyeglass lens between said pair of lens rotating shafts;
a grinding stone rotatably provided capable of relatively approaching and separating to said lens rotating shafts;
a shaft-to-shaft distance variable device for changing a shaft-to-shaft distance between said lens rotating shafts and said grinding stone by relatively approaching and separating said lens rotating shafts and said grinding stone; and
an arithmetic control circuit for adjusting the shaft-to-shaft distance between said lens rotating shafts and said grinding stone by controlling said shaft rotating driving device and the shaft-to-shaft distance variable device in motion based on lens shape information ($\theta i, \rho i$); and
a lens shape measuring device for measuring a lens thickness which is along a lens shape of said eyeglass lens based on the lens shape information ($\theta i, \rho i$), wherein

said arithmetic control circuit restricts a movement of said lens shape measuring device and moves said lens rotating shafts to slant the eyeglass lens held between said lens retaining members by adapting the eyeglass lens to contact with said lens shape measuring device.

17. (New) A lens grinding processing apparatus comprising:

an apparatus main body;

a pair of lens rotating shafts provided rotatably and adjustably in said apparatus main body for relatively approaching and separating on a same axis to hold an eyeglass lens;

a shaft rotating driving device for rotating and driving said pair of lens rotating shafts;

lens retaining members fixed to opposed end sections of said pair of lens rotating shafts respectively capable of slanting adjustably for slantably holding said eyeglass lens between said pair of lens rotating shafts;

a grinding stone rotatably provided capable of relatively approaching and separating to said lens rotating shafts;

a shaft-to-shaft distance variable device for changing a shaft-to-shaft distance between said lens rotating shafts and said grinding stone by relatively approaching and separating said lens rotating shafts and said grinding stone; and

an arithmetic control circuit for adjusting the shaft-to-shaft distance between said lens rotating shafts and said grinding stone by controlling said shaft rotating driving device and the shaft-to-shaft distance variable device in motion based on lens shape information $(\theta i, \rho i)$; and

a lens shape measuring device for measuring a lens thickness which is along a lens shape of said eyeglass lens based on the lens shape information $(\theta i, \rho i)$, wherein

said arithmetic control circuit controls a movement of at least one of said lens shape measuring device and said lens rotating shafts such that the eyeglass lens held between said lens retaining members contacts with said lens shape measuring device and slanted by said lens shape measuring device.